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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
RISK REDUCTION ENGINEERING LABORATORY
CINCINNATI, OHIO 45268

DATE: April 7, 1992

SUBJECT: Medley Farm Superfund Site Remedial Design
Review of Remedial Design (RD) Deliverables

TO: Ralph O. Howard, Jr.
Remedial Project Manager

FROM: Michelle Simon *Michelle Simon*
Superfund Technical Assistance Response Team
Risk Reduction Engineering Laboratory

In response to your request, dated March 9, 1992, for a review of the Technical Memorandum Regarding Treatability Study and supporting documents from the Medley Farm Site, two of RREL's technology teams have provided comments (attached). In general their conclusions are that the selected technologies, air stripping and soil vapor extraction (SVE), are appropriate to the volatile organic compounds (VOCs) and further treatability tests are not required to verify their applicability. Please note that the PCB's and pesticides in the surface soils will not be treated by SVE but appear to be present in lower than action level concentrations.

The offgases from air stripping and SVE will require monitoring and control. You may wish to contact the Superfund Air Coordinator for Region IV, Lee Page, FTS: 257-2864, (404) 347-2864, for assistance.

Please contact me (FTS: 684-7469) or Joan Colson, (FTS: 684-7501) if you have any questions or if you would like further assistance.


cc: Joan Colson, Engineering Forum
Ed Bates, Superfund Technical Assistance Response Team

10294304



March 24, 1992

Subject: Review of the Remedial Action Plan for Medley Farm, SC, Site

From: Ron Turner 
TEDS, PCSB, WHWTRD

To: Michelle Simon
RSS, TSB

The groundwater remediation information for extraction/air stripping was reviewed. I agree with the Contractor (RMT) that air stripping technology is well established for the compounds of concern, and separate treatability studies may not be necessary to provide information for the design. The air stripper removal efficiency will have to approach 99 percent for the higher initial concentration VOCs, but this is within the technology. However, two columns in series could be necessary, depending on the liquid loading rate and the air-to-water ratio.

The offgas VOC control should be required, even though the State may not require a permit for sources emitting less than 1000 pounds per month.

The air stripper system may require equipment to reduce the iron content and alkalinity of the groundwater to control potential fouling, scaling and biological problems. A cost estimate is needed for these O&M items, if not already included.




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REPLY TO:
Releases Control Branch
U. S. EPA (MS-106)
2890 Woodbridge Avenue
Edison, New Jersey 08837-3679

DATE: April 1, 1992

SUBJECT: Technical Assistance: Review of SVE for Medley Farm Site,
South Carolina

FROM: Uwe Frank 
Chemist, Technology Evaluation Section, RCB
Superfund Technology Demonstration Division

TO: Michelle Simon
Chemical Engineer, Regional Support Section, TSB
Superfund Technology Demonstration Division

In accordance with your request, I have reviewed information provided in the ROD, Final Remedial Investigation Report, and the March 6, 1992 Technical Memorandum from RMT, Inc. As requested my review addresses soil vapor extraction (SVE), and specifically the practicality of removing the VOCs of concern from soil at the Medley Farm Site by SVE. In addition, I have also reviewed RMT's recommendation that treatability studies not be performed separately and prior to the design of the SVE system required for the Medley Farm RD/RA, but that they be integrated with the actual remedial action to optimize the engineering and construction related tasks. The primary factors considered to determine the practicality of SVE at this site were contaminant volatility and concentration, and soil permeability. Within this context, I believe that SVE is an applicable technology for use as a remedial option at this site, and the following provide the justifications for this conclusion. It must be noted, however, that SVE will not be effective for obviously non-volatile compounds such as PCBs and pesticides (toxaphene) also detected in surface soil at the Medley Farm Site (See ROD, Table 5).

As far as contaminant volatility is concerned, the VOCs that are present above the ROD prescribed remediation levels in areas RA-1 and RA-2 are tetrachloroethylene, trichloroethylene, 1,2 - dichloroethylene, 1,2 - dichloroethane, and methylene chloride. The dimensionless Henry's Law constants for these compounds at 20°C are: 0.59, 0.35, cis-0.15/trans - 0.36, 0.06, and 0.10, respectively. In addition the Vapor Pressures of these compounds are orders of magnitude greater than 1.0 mm Hg (Methylene chloride:



350; 1,2 - dichloroethane: 61; etc.). Consequently, SVE has been shown to be effective when the contaminants have a Henry's Law constant greater than 0.01 and vapor pressures of 1.0 mm Hg (20 °C) or greater.

The concentration levels for soil remediation also appear appropriate (ROD, Table 3). SVE is not as applicable if the concentration limits are low compound-specific limits (e.g., 5 ug/kg tetrachloroethylene or 10 ug/kg trichloroethylene) to be achieved in a short duration of time. The performance of SVE at such low levels has not been widely demonstrated, especially in nonhomogeneous soils (such as the Piedmont region). However, the site is a good candidate for SVE if the concentration limits to be achieved are high ug/kg limits (e.g., total VOCs greater than 500 ug/kg), as is shown in Table 3.

The soil permeability at the remediation sites have not been determined. Instead, RMT is relying on previous experience. The site lies within the Piedmont Physiographic Province. The geology is typical of the Piedmont surficial layer of residual soil underlain by saprolite and rock. The residual soil thickness ranges from approximately three to thirteen feet. Soil types encountered include silty and clayey sands, silty and sandy clay, and sandy silt. Grain size of the sand fraction is predominantly fine to medium. The thickness of the saprolite unit varies from approximately 25 to 80 feet. Soil type encountered include silty sand and silt. Silty sand is by far the predominant soil typed within the saprolite. SVE is most effective at sites where the water table is 20 feet or greater in depth. Where the water table is nearer the surface (less than 5 to 10 feet), SVE may not be appropriate or, if used, may require some means to lower the water table. In addition, soils such as sands and gravel are highly permeable and amenable to SVE. Fine textured soils high in silt and/or clay are more slowly permeable and SVE may or may not be applicable. Since the Medley farm site is mostly described as consisting of clayey/silty sands, SVE should be applicable.

RMT's proposal to omit treatability studies may have some justification, especially in non-homogeneous areas such as the Piedmont region. Generally, the objective of treatability studies are to develop a well-thought out and reasoned design process and to construct a SVE system that removes the greatest degree of contamination from the site in the most efficient, timely, and cost-effective manner. The attainment of that objective will occur through an understanding of the three main determinants of system effectiveness: the composition and characteristics of the contaminant; the vapor flow path and flow rate; and the location of the contamination with respect to the vapor flow paths. The design of an SVE system is basically a process to maximize the intersection of the vapor flow paths with the contaminated zone. Operation of the system should be done to maximize the efficiency of the contaminant removal and reduce costs. As a minimum it is therefore recommended that air permeability tests be conducted at the site to

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confirm that SVE is applicable. The field tests will provide data on and confirm the air permeability at the site. The data can also be used to measure the radius of influence in the vicinity of the testing point, and either confirm that the 30-40 feet well spacings are adequate or provide information on additional well placement.

If you have any questions, please call me on FTS/340-6626.

cc: M. Gruenfeld
D. Sullivan

March 24, 1992

Subject: Review of the Remedial Action Plan for Medley Farm, SC, Site

From: Ron Turner *RTS*
TEDS, PCSB, WHWTRD

To: Michelle Simon
RSS, TSB

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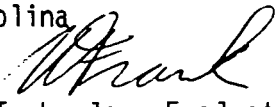


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REPLY TO:
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South Carolina

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Chemist, Technology Evaluation Section, RCB
Superfund Technology Demonstration Division

TO: Michelle Simon
Chemical Engineer, Regional Support Section, TSB
Superfund Technology Demonstration Division

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